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IN THE SPECIFICATION:

Referring now to the drawings, FIG. 1 depicts a typical zinc/air fuel cell, wherein two polymer matrix membranes 4-3, 2 are disposed between a zinc anode 3-1 and an air cathode 4. The first membrane is an anode protective membrane 4-3 and the second membrane is a hydroxide conductive membrane 2. The membranes are not only the source of ionic species, and are highly conductive to that species, but they also provide a protective layer to the electrodes to prevent the usual sources of cell destruction. The membranes prevent diffusion of zinc oxidation product into the electrolyte solution phase, they prevent corrosion of the zinc anode by either the electrolyte solution or air, and they prevent blockage of the cathode air channels by water from the electrolyte solution. The zinc/air system of FIG. 2 includes a protective and ionically conductive polymer matrix membrane 5, 6 on the surface of a zinc anode 3-1 and an air cathode 4, and an aqueous electrolyte 7 between the two.